

What is claimed is:

1. In a developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein said plurality of developing sections include at least one developing section in which a flux density of said main magnetic pole in a normal direction has an attenuation ratio of 40 % or above and at least one developing section in which said flux density has an attenuation ratio of 30 % or below.

2. The device as claimed in claim 1, wherein said developing section with the attenuation ratio of 40 % or above stores black toner while said developing section with the attenuation ratio of 30 % or below stores toner of another color.

3. The device as claimed in claim 2, wherein said



developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

4. The device as claimed in claim 2, wherein said plurality of developing sections are constructed into a revolver.

5. The device as claimed in claim 4, wherein said plurality of developing sections are matched in weight to thereby balance rotation of said revolver.

6. The device as claimed in claim 5, wherein said developing section with the attenuation ratio of 40 % or above further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

7. The device as claimed in claim 5, wherein any one of said plurality of developing sections whose main pole has a half width of  $22^\circ$  or below further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

8. The device as claimed in claim 1, wherein said plurality of developing sections are constructed into a revolver.

9. The device as claimed in claim 8, wherein said plurality of developing sections are matched in weight to thereby balance rotation of said revolver.



10. The device as claimed in claim 9, wherein said developing section with the attenuation ratio of 40 % or above further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

11. The device as claimed in claim 9, wherein any one of said plurality of developing sections whose main pole has a half width of  $22^\circ$  or below further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

12. In a developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein said plurality of developing sections include at least one developing section in which the main pole has a half width of  $22^\circ$  or below and at least one developing section in which said half value is  $25^\circ$  or above.



13. The device as claimed in claim 12, wherein said developing section with the half value of  $22^\circ$  or below stores black toner while said developing section with the half value of  $25^\circ$  or above stores toner of another color.

14. The device as claimed in claim 13, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

15. The device as claimed in claim 13, wherein said plurality of developing sections are constructed into a revolver.

16. The device as claimed in claim 15, wherein said plurality of developing sections are matched in weight to thereby balance rotation of said revolver.

17. The device as claimed in claim 16, wherein said developing section with the attenuation ratio of 40 % or above further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

18. The device as claimed in claim 16, wherein any one of said plurality of developing sections whose main pole has a half width of  $22^\circ$  or below further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

19. The device as claimed in claim 12, wherein said



plurality of developing sections are constructed into a revolver.

20. The device as claimed in claim 19, wherein said plurality of developing sections are matched in weight to thereby balance rotation of said revolver.

21. The device as claimed in claim 20, wherein said developing section with the attenuation ratio of 40 % or above further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

22. The device as claimed in claim 20, wherein any one of said plurality of developing sections whose main pole has a half width of  $22^\circ$  or below further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

23. In a developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

- a rotatable nonmagnetic sleeve; and

- a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said



sleeve in a form of the magnet brush;

wherein a flux density of the main pole in a tangential direction has an attenuation ratio of 40 % or above in all of the plurality of developing sections, and

one of the plurality of developing sections storing black toner includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force while the other developing sections storing toner of other colors do not include said auxiliary magnetic pole.

24. The device as claimed in claim 23, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

25. The device as claimed in claim 23, wherein said plurality of developing sections are constructed into a revolver.

26. The device as claimed in claim 25, wherein said plurality of developing sections are matched in weight to thereby balance rotation of said revolver.

27. The device as claimed in claim 26, wherein said developing section with the attenuation ratio of 40 % or above further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

28. The device as claimed in claim 26, wherein any



one of said plurality of developing sections whose main pole has a half width of  $22^\circ$  or below further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

29. In a developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein the main pole has a half width of  $22^\circ$  or below in all of the plurality of developing sections, and

one of the plurality of developing sections storing black toner includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force while the other developing sections storing toner of other colors do not include said auxiliary magnetic pole.

30. The device as claimed in claim 29, wherein said developing section storing the black toner is implemented



as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

31. The device as claimed in claim 29, wherein said plurality of developing sections are constructed into a revolver.

32. The device as claimed in claim 31, wherein said plurality of developing sections are matched in weight to thereby balance rotation of said revolver.

33. The device as claimed in claim 32, wherein said developing section with the attenuation ratio of 40 % or above further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

34. The device as claimed in claim 32, wherein any one of said plurality of developing sections whose main pole has a half width of  $22^\circ$  or below further includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

35. In a process cartridge comprising a developing device and an image carrier, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact said image carrier;

said developer carrier comprising:



a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein said plurality of developing sections include at least one developing section in which a flux density of said main magnetic pole in a normal direction has an attenuation ratio of 40 % or above and at least one developing section in which said flux density has an attenuation ratio of 30 % or below.

36. The process cartridge as claimed in claim 35, wherein said developing section with the attenuation ratio of 40 % or above stores black toner while said developing section with the attenuation ratio of 30 % or below stores toner of another color.

37. The process cartridge as claimed in claim 36, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

38. The process cartridge as claimed in claim 35, wherein a gap for development between said image carrier



and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

39. The process cartridge as claimed in claim 38, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

40. In a process cartridge comprising a developing device and an image carrier, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact said image carrier, said developer carrier comprising:

- a rotatable nonmagnetic sleeve; and

- a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein said plurality of developing sections include at least one developing section in which the main pole has a half width of  $22^\circ$  or below and at least one developing section in which said half value is  $25^\circ$  or above.

41. The process cartridge as claimed in claim 40,



wherein said developing section with the half value of  $22^\circ$  or below stores black toner while said developing section with the half value of  $25^\circ$  or above stores toner of another color.

42. The process cartridge as claimed in claim 41, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

43. The process cartridge as claimed in claim 40, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

44. The process cartridge as claimed in claim 43, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

45. In a process cartridge comprising a developing device and a developer carrier, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and



a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein a flux density of the main pole in a tangential direction has an attenuation ratio of 40 % or above in all of the plurality of developing sections, and

one of the plurality of developing sections storing black toner includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force while the other developing sections storing toner of other

46. The process cartridge as claimed in claim 45, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

47. The process cartridge as claimed in claim 35, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

48. The process cartridge as claimed in claim 47, wherein said developer carrier of the developing section storing the black toner has a greater diameter than



developer carriers of the other developing sections storing toner of other colors.

49. In a process cartridge comprising a developing device and a developer carrier, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein the main pole has a half width of  $22^\circ$  or below in all of the plurality of developing sections, and

one of the plurality of developing sections storing black toner includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force while the other developing sections storing toner of other colors do not include said auxiliary magnetic pole.

50. The process cartridge as claimed in claim 49, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said



developing section storing toner of another color is implemented as part of a revolver.

51. The process cartridge as claimed in claim 49, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

52. The process cartridge as claimed in claim 51, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

53. In a color image forming apparatus comprising a developing device, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein said plurality of developing sections



include at least one developing section in which a flux density of said main magnetic pole in a normal direction has an attenuation ratio of 40 % or above and at least one developing section in which said flux density has an attenuation ratio of 30 % or below.

54. The apparatus as claimed in claim 53, wherein said developing section with the attenuation ratio of 40 % or above stores black toner while said developing section with the attenuation ratio of 30 % or below stores toner of another color.

55. The apparatus as claimed in claim 54, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

56. The apparatus as claimed in claim 53, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

57. The apparatus as claimed in claim 53, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

58. In a color image forming apparatus comprising



a developing device, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein said plurality of developing sections include at least one developing section in which the main pole has a half width of  $22^\circ$  or below and at least one developing section in which said half value is  $25^\circ$  or above.

59. The apparatus as claimed in claim 58, wherein said developing section with the half value of  $22^\circ$  or below stores black toner while said developing section with the half value of  $25^\circ$  or above stores toner of another color.

60. The apparatus as claimed in claim 59, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.



61. The apparatus as claimed in claim 58, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

62. The apparatus as claimed in claim 61, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

63. In a color image forming apparatus comprising a developing device, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:

- a rotatable nonmagnetic sleeve; and

- a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein a flux density of the main pole in a tangential direction has an attenuation ratio of 40 % or above in all of the plurality of developing sections, and



one of the plurality of developing sections storing black toner includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force while the other developing sections storing toner of other colors do not include said auxiliary magnetic pole.

64. The apparatus as claimed in claim 23, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

65. The apparatus as claimed in claim 63, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

66. The apparatus as claimed in claim 65, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

67. In an image forming apparatus comprising a developing device, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact an image carrier, said developer carrier comprising:



a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein the main pole has a half width of  $22^\circ$  or below in all of the plurality of developing sections, and

one of the plurality of developing sections storing black toner includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force while the other developing sections storing toner of other colors do not include said auxiliary magnetic pole.

68. The apparatus as claimed in claim 67, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

69. The apparatus as claimed in claim 67, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

70. The apparatus as claimed in claim 69, wherein said developer carrier of the developing section storing



the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

71. In a color image forming apparatus comprising a process cartridge that comprises a developing device and an image carrier, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact said image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein said plurality of developing sections include at least one developing section in which a flux density of said main magnetic pole in a normal direction has an attenuation ratio of 40 % or above and at least one developing section in which said flux density has an attenuation ratio of 30 % or below.

72. The apparatus as claimed in claim 71, wherein said developing section with the attenuation ratio of 40 %



or above stores black toner while said developing section with the attenuation ratio of 30 % or below stores toner of another color.

73. The apparatus as claimed in claim 72, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

74. The apparatus as claimed in claim 71, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

75. The apparatus as claimed in claim 74, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

76. In a color image forming apparatus comprising a process cartridge that comprises a developing device and an image carrier, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact said image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and



a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein said plurality of developing sections include at least one developing section in which the main pole has a half width of  $22^\circ$  or below and at least one developing section in which said half value is  $25^\circ$  or above.

77. The apparatus as claimed in claim 76, wherein said developing section with the half value of  $22^\circ$  or below stores black toner while said developing section with the half value of  $25^\circ$  or above stores toner of another color.

78. The apparatus as claimed in claim 77, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

79. The apparatus as claimed in claim 76, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

80. The apparatus as claimed in claim 79, wherein said developer carrier of the developing section storing



the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

81. In a color image forming apparatus comprising a process cartridge that comprises a developing device and an image carrier, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact said image carrier, said developer carrier comprising:

- a rotatable nonmagnetic sleeve; and

- a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein a flux density of the main pole in a tangential direction has an attenuation ratio of 40 % or above in all of the plurality of developing sections, and

one of the plurality of developing sections storing black toner includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force while the other developing sections storing toner of other colors do not include said auxiliary magnetic pole.



82. The apparatus as claimed in claim 81, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

83. The apparatus as claimed in claim 81, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

84. The apparatus as claimed in claim 83, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

85. In an image forming apparatus comprising a process cartridge that comprises a developing device and an image carrier, said developing device comprising a plurality of developing sections each including a developer carrier that causes a developer deposited thereon to form a magnet brush and contact said image carrier, said developer carrier comprising:

- a rotatable nonmagnetic sleeve; and

- a stationary magnet roller accommodated in said sleeve and including a magnetic pole for scooping up the developer to said sleeve, a magnetic pole for conveying



said developer deposited on said sleeve, and a main magnetic pole for causing said developer to rise on said sleeve in a form of the magnet brush;

wherein the main pole has a half width of  $22^\circ$  or below in all of the plurality of developing sections, and

one of the plurality of developing sections storing black toner includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force while the other developing sections storing toner of other colors do not include said auxiliary magnetic pole.

86. The apparatus as claimed in claim 85, wherein said developing section storing the black toner is implemented as a stand-alone developing unit while said developing section storing toner of another color is implemented as part of a revolver.

87. The apparatus as claimed in claim 85, wherein a gap for development between said image carrier and said developer carrier is reduced only in one of said plurality of developing sections storing black toner.

88. The apparatus as claimed in claim 87, wherein said developer carrier of the developing section storing the black toner has a greater diameter than developer carriers of the other developing sections storing toner of other colors.

89. In a developing device for forming a magnet brush



on a developer carrier to thereby develop a latent image formed on an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve;

wherein a flux density available with a main magnetic pole for development, which is included in said magnet roller, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute value, which is positioned upstream of substantially a center of a developing region, relative to a distance on a circumference of said sleeve.

90. The device as claimed in claim 89, wherein said magnet roller includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

91. The device as claimed in claim 89, further comprising a jig for reducing a leakage magnetic field of the main pole.

92. The device as claimed in claim 91, wherein said jig is formed of a soft magnetic material.

93. The device as claimed in claim 92, wherein said jig comprises a magnet.

94. The device as claimed in claim 93, wherein an alternating electric field is applied during development.



95. The device as claimed in claim 89, further comprising a jig for reducing a leakage magnetic field of the main pole.

96. The device as claimed in claim 95, wherein said jig is formed of a soft magnetic material.

97. The device as claimed in claim 96, wherein said jig comprises a magnet.

98. The device as claimed in claim 89, wherein an alternating electric field is applied during development.

99. The device as claimed in claim 96, wherein said jig comprises a magnet.

100. In a developing device for forming a magnet brush on a developer carrier to thereby develop a latent image formed on an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve;

wherein a flux density available with a main magnetic pole for development, which is included in said magnet roller, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute value, which is positioned downstream of substantially a center of a developing region, relative to a distance on a circumference of said sleeve.



101. The device as claimed in claim 100, wherein said magnet roller includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

102. The device as claimed in claim 101, further comprising a jig for reducing a leakage magnetic field of the main pole.

103. The device as claimed in claim 102, wherein said jig is formed of a soft magnetic material.

104. The device as claimed in claim 103, wherein said jig comprises a magnet.

105. The device as claimed in claim 104, wherein an alternating electric field is applied during development.

106. The device as claimed in claim 100, further comprising a jig for reducing a leakage magnetic field of the main pole.

107. The device as claimed in claim 106, wherein said jig is formed of a soft magnetic material.

108. The device as claimed in claim 107, wherein said jig comprises a magnet.

109. The device as claimed in claim 108, wherein an alternating electric field is applied during development.

110. The device as claimed in claim 100, wherein an alternating electric field is applied during development.

111. In a developing device for forming a magnet brush on a developer carrier to thereby develop a latent



image formed on an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve;

wherein a flux density available with a main magnetic pole for development, which is included in said magnet roller, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute value, which is positioned substantially at a center of a developing region, relative to a distance on a circumference of said sleeve.

112. The device as claimed in claim 111, wherein said magnet roller includes an auxiliary magnetic pole for helping the main magnetic pole form a magnetic force.

113. The device as claimed in claim 112, further comprising a jig for reducing a leakage magnetic field of the main pole.

114. The device as claimed in claim 113, wherein said jig is formed of a soft magnetic material.

115. The device as claimed in claim 114, wherein said jig comprises a magnet.

116. The device as claimed in claim 115, wherein an alternating electric field is applied during development.

117. The device as claimed in claim 100, further



comprising a jig for reducing a leakage magnetic field of the main pole.

118. The device as claimed in claim 117, wherein said jig is formed of a soft magnetic material.

119. The device as claimed in claim 118, wherein said jig comprises a magnet.

120. The device as claimed in claim 119, wherein an alternating electric field is applied during development.

121. The device as claimed in claim 111, wherein an alternating electric field is applied during development.

122. In an image forming apparatus comprising at least one developing device for forming a magnet brush on a developer carrier to thereby develop a latent image formed on an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve;

wherein a flux density available with a main magnetic pole for development, which is included in said magnet roller, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute value, which is positioned upstream of substantially a center of a developing region, relative to a distance on a circumference on said sleeve.



123. In an image forming apparatus comprising at least one developing device for forming a magnet brush on a developer carrier to thereby develop a latent image formed on an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve;

wherein a flux density available with a main magnetic pole for development, which is included in said magnet roller, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute value, which is positioned downstream of substantially a center of a developing region, relative to a distance on a circumference of said sleeve.

124. In an image forming apparatus comprising at least one developing device for forming a magnet brush on a developer carrier to thereby develop a latent image formed on an image carrier, said developer carrier comprising:

a rotatable nonmagnetic sleeve; and

a stationary magnet roller accommodated in said sleeve;

wherein a flux density available with a main magnetic pole for development, which is included in said magnet



roller, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute value, which is positioned substantially at a center of a developing region.

125. In a magnet roller for a developing device for forming a magnet brush on a developer carrier, a flux density available with said magnet roller, which is accommodated in a sleeve, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute value, which is positioned upstream of substantially a center of a developing region, relative to a distance on a circumference of said sleeve.

126. In a magnet roller for a developing device for forming a magnet brush on a developer carrier, a flux density available with said magnet roller, which is accommodated in a sleeve, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute value, which is positioned downstream of substantially a center of a developing region, relative to a distance on a circumference of said sleeve.

127. In a magnet roller for a developing device for forming a magnet brush on a developer carrier, a flux density available with said magnet roller, which is accommodated in a sleeve, in a tangential direction has a maximum variation ratio of 40 T/m or above in absolute



value, which is positioned substantially a center of a developing region, relative to a distance on a circumference of said sleeve.